United States Department of Agriculture **Forest Service** **Intermountain Region**

Forest Health Protection
Boise Field Office
1249 South Vinnell Way, Suite 200
Boise, ID 83709-1663

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Route To:

Subject: Verbenone in Administrative Areas, Sawtooth National Recreation Area, Pettit Lake

To: Forest Supervisor, Sawtooth NF

At the request of SNRA personnel, Boise Field Office Forest Health Protection (FHP) personnel have been applying the mountain pine beetle antiaggregant verbenone to lodgepole trees among summer homes and administrative areas around Pettit Lake from 2001-2003. The enclosed report (BFO-PR-04-01) summarizes the results of the verbenone trial over the past 3 years.

Please contact Rob Progar or Dayle Bennett if you need additional information or assistance.

/s/ Dayle D. Bennett (for)
WILLIAM W. BOETTCHER
Director, State and Private Forestry

Enclosure

cc:
D.Bennett, FHP
J.Roberts, FHP
R.Progar, FHP
J.Rineholt, SNRA

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2001-2003 Pettit Lake Verbenone Trial

Progress Report, October 2003

BFO-PR-04-01

To assess the ability of verbenone to deter mortal attack by the mountain pine beetle, *Dendroctonus ponderosae* on high value areas of lodgepole pine (*Pinus contorta var. latifolia*), FHP personnel applied verbenone pouches at administrative sites and summer homes located near sensitive riparian areas around Pettit Lake in the Sawtooth Valley in the Sawtooth National Recreation Area.

In June 2001, 18 one-half acre rectangular (210 x 105 ft) plots were located in and around administrative facilities at Pettit Lake in mature lodgepole pine stands. The species and diameter at breast height (d.b.h.) were recorded for each plot tree.

The verbenone formulation consisted of 98 percent technical grade, 80 percent (-), 20 percent (+) verbenone (4,6,6-trimethylbicyclo[3.1.1]-hept-3-en-2-one). The verbenone was formulated by and purchased from Phero Tech Inc., Delta, British Columbia, Canada, and applied at the rate of 40 5g pouches/ac. On June 14, 2001, June 12, 2002, and June 17, 2003, verbenone pouches were placed on the north-facing side of the same 20 trees in each of eight randomly selected plots at a height of 12 feet and a spacing of one pouch every 32 feet or one pouch/1000 feet. The eight remaining untreated plots were used for comparison. During September 2001, October 2002, and September 2003, current-year beetle attacks were recorded and evaluated. One-way ANOVA (Sokal and Rohlf 1981) was used to compare the impacts of MPB on lodgepole pine between treatments. Treatments were considered significant at $P \leq 0.05$. SAS JMP software (SAS 2001) was used for all analyses by ANOVA.

Results

Pretreatment analysis of host tree d.b.h. showed no significant difference in the number of trees within size class between plots receiving verbenone and those in the untreated check (Figure 1).

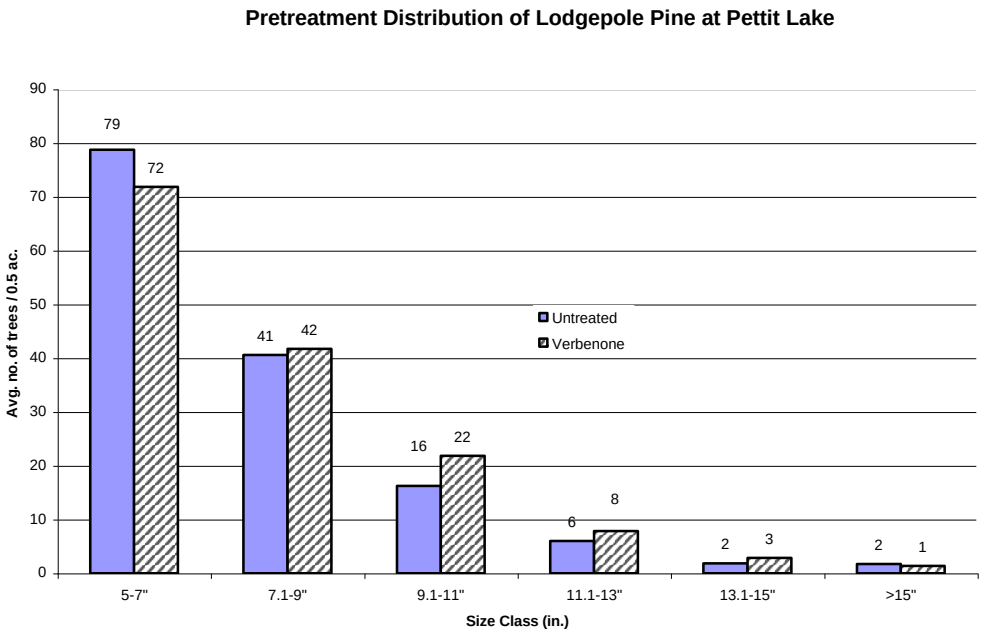

Figure 1. Average per plot density of susceptible lodgepole pine between treatments by d.b.h.

In 2001, there was little beetle activity in the Pettit Lake treatment plots with an average of two trees attacked per plot on the untreated plots and three trees attacked on the plots treated with verbenone (Figure 2). In 2002, there were an average of 8.1 (SE = 6.02) trees attacked in the untreated plots and 3.6 (SE = 1.9) trees attacked in the plots containing verbenone. Although there were twice as many trees attacked in untreated plots (Figure 2), differences in between treatments were not significant (F = 0.50; df = 1, 14; P = 0.48). In 2003, there were 8.37 (SE = 4.3) trees attacked in the untreated plots and 2.25 (SE = 1.58) trees attacked in the verbenone plots. However, differences between treatments were not significant (F = 1.78; df = 1, 14; P = 0.21).

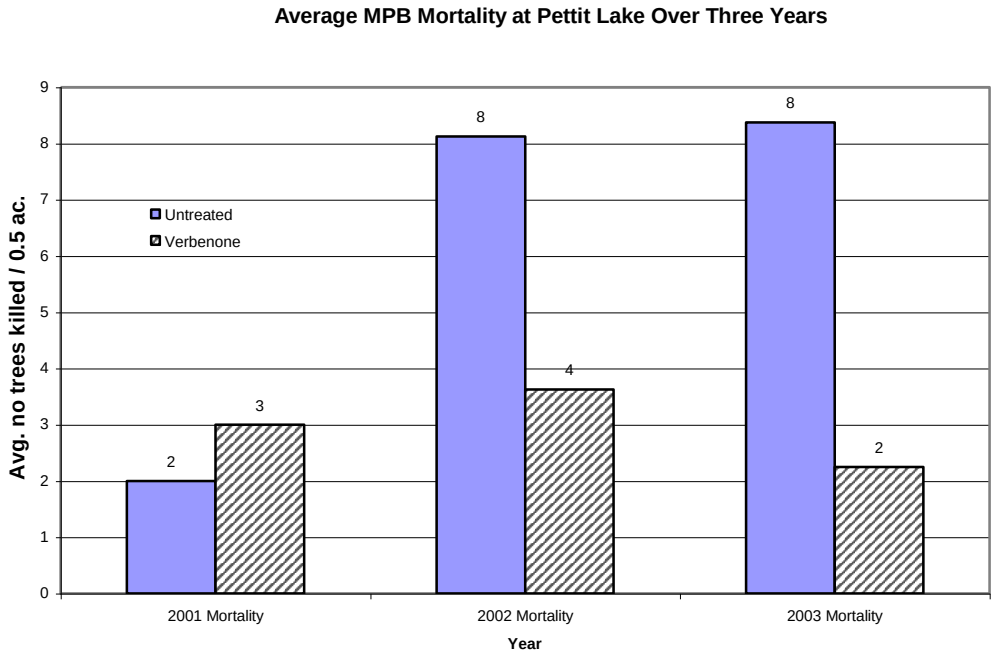

Figure 2. Average number of successful MPB attacks/plot during 2000-2003.

Mountain pine beetle is distributed unevenly among the plots at Pettit Lake. The plots on the northeast side of the lake had much higher densities of MPB than those on the south side of the lake among the summer homes. Plots on the northeast have had high mortality in all size classes of trees and those on the south side of the lake have little or no MPB-related mortality. Therefore, the distribution of MPB-caused mortality by size class over time is unlike the pattern observed in the plots at Little Redfish and Redfish Lakes where mortality first occurred in the larger diameter trees (BFO-TR-04-02). Figure 3 shows that MPB-caused mortality occurred fairly uniformly among all size classes of trees.

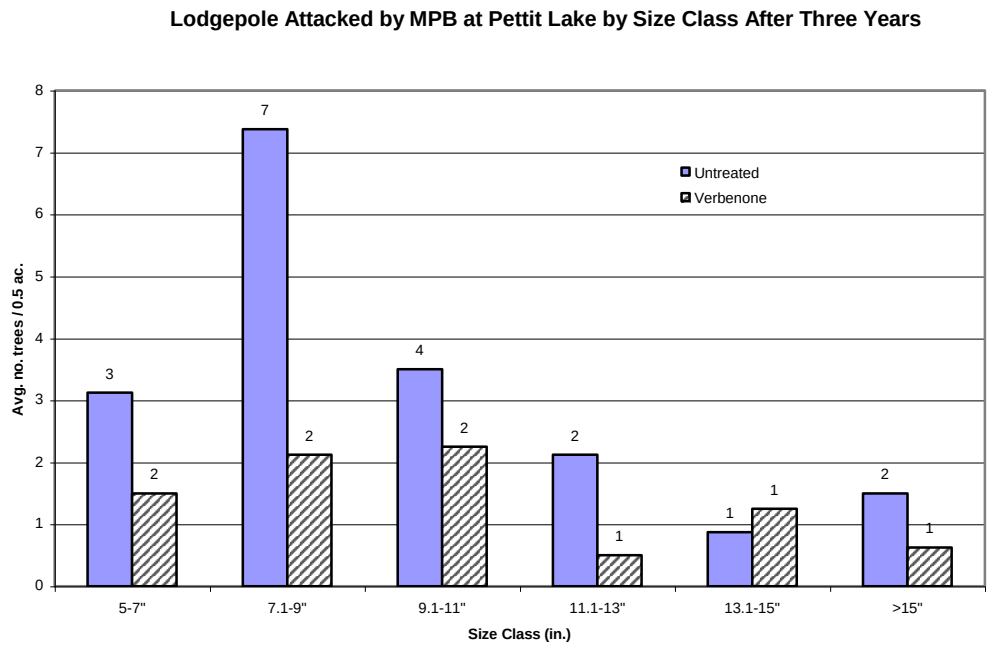

Figure 3. Average number of trees remaining by d.b.h. size class after 4 years by treatment and d.b.h.

Figure 4 shows the distribution of the remaining susceptible lodgepole pine by d.b.h. There are sufficient numbers of susceptible lodgepole remaining to continue testing the ability of verbenone to deter mortal attacks of lodgepole pine. I recommend that Forest Health Protection personnel continue to treat the same plots to determine whether verbenone can deter MPB mortality of lodgepole pine under conditions of increasing beetle pressure.

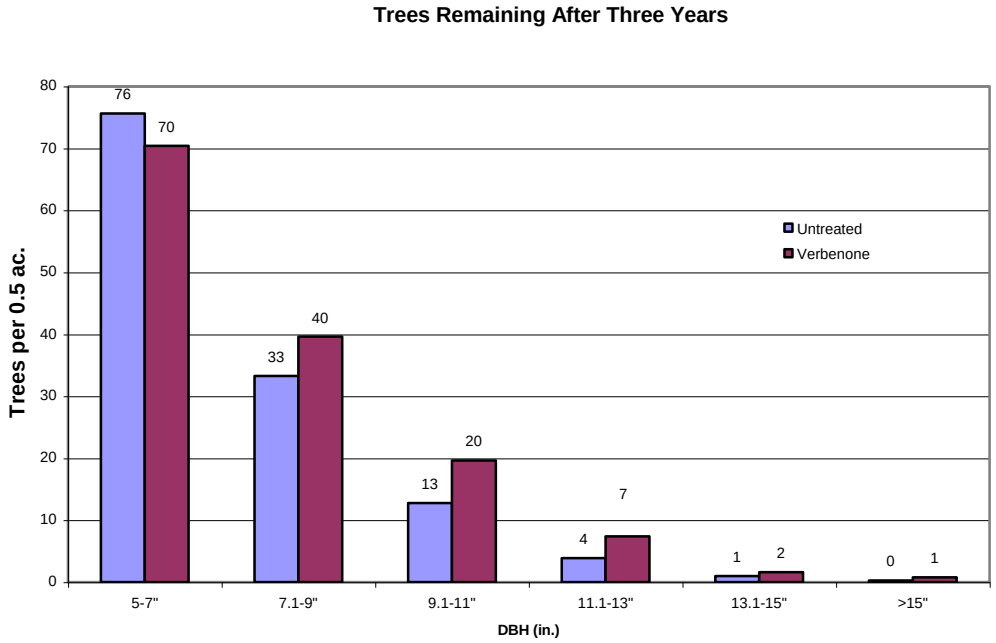

Figure 4. Average number of trees remaining by d.b.h. size class after 4 years by treatment and d.b.h.

LITERATURE CITED

Sokal, R. R., and F. J. Rolf. 1981. Biometry. W. H. Freeman and Company, New York. 859 p.
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/s/ R.A. Progar